

independent claims has been amended to recite the homogeneous linear single site catalyzed copolymer as having a density of at least 0.902 g/cc. Support for this amendment can be found in the specification at, for example, Example 2 on Page 16. Each of the independent claims has also been amended by the addition of the recitation that the homogeneous linear single site catalyzed copolymer is present in the film in an amount of from 15 percent to 100 percent, based on the weight of the film. Support for this amendment can be found in the specification at, for example, Examples 1-4 (each of which disclose the homogeneous copolymer present in an amount of 100 percent, based on film weight), taken in combination with, for example, Example 39, which discloses a film in which the homogeneous linear copolymer is present in an amount of 14.58 percent, based on total film weight.

Claim 64 has been amended to recite an impact strength of from 56 to 87 pounds. Support for this amendment can be found in the specification at, for example, Page 23 of the specification, in Table IV, which disclosed Example 18 as having a peak instrumented impact strength of 56.4 pounds, as well as disclosing Example 11 as having an impact strength of 86.8 pounds. Accordingly, Applicants respectfully request withdrawal of the 35 USC 112 second paragraph of Claim 64 as indefinite, set forth in Paragraph 2 of the 17 January office action.

No new matter is added by the amendments.

**II. The Rejection of Claims 1-5, 8, 9, 13, 14, 36, 41, 42, 57, 60, 61, and 63  
as Anticipated by RALPH**

In Paragraph 4 of the 17 January Office Action, Claims 1-5, 8, 9, 13, 14, 36, 41, 42, 57, 60, 61, and 63 are rejected under 35 USC 102(b) as anticipated by U.S. Patent No. 5,272,016, to Ralph ("RALPH"). The Office Action states that RALPH teaches shrinkable 3-layer films having core

and surface layers comprising a blend of VLDPE, a plastomer, and a homogeneous ethylene/butene copolymer having a density of 0.900 g/cc (i.e., EXACT 3010C). The Office Action states that the EXACT 3010C copolymer corresponds to Applicants' recited density of 0.901 g/cc, and that Applicants' recited value of "0.901" falls within "about 0.900 g/cc" disclosed in RALPH. The Office Action also states that the recitation of the film as being cooled by cascading water is a process limitation with nothing on the record to indicate that the product of this process is in any way different from a film made in any other way.

In response, Applicants contend that Claims 1-5, 8, 9, 13, 14, 36, 41, 42, 57, 60, 61, and 63, as amended above, are patentable over RALPH. Applicants point out that as amended, each of the claims recites a density of at least 0.902 g/cc. While Applicants do not agree that the previously recited 0.901 g/cc overlaps the disclosure of "about 0.900 g/cc" disclosed in RALPH<sup>1</sup>, Applicants, in the spirit of cooperation, and in acknowledgement of the statement in the office action that "about 0.900 g/cc is within the "experimental error" of 0.901", have amended the claims in a manner so that it is clear that no overlap occurs. That is, "at least 0.902" g/cc is not overlapped by, or within the experimental error of, "about 0.900 g/cc". Accordingly, the rejection under 35 USC 102(b) should be withdrawn.

### **III. The Rejection of Claims 1-5, 7-15, 36, 42, and 56-64 as obvious over RALPH**

In Paragraph 5 of the 17 January Office Action, Claims 1-5, 7-15, 36, 42, and 56-64 are rejected under 35 USC 103(a) as unpatentable over RALPH. The Office Action refers to the

description of RALPH set forth in Paragraph 4 of the Office Action, and further states that the EXACT polymer of RALPH is the same as Applicant's recited polymer, and that there is overlap between Applicants' recited "greater than about 0.901 g/cc" and RALPH's disclosure of "about 0.900 g/cc", and that any density differences are minor obvious variations expected to have the same general properties, and that choosing the overlapping portion would be prima facie obvious. The Office Action refers to various court opinions and states that RALPH discloses VLDPE as a copolymer of ethylene and alpha-olefin and that it would have been obvious to have used homopolymers for this component (re Claim 8), and that RALPH teaches (re Claims 10, 11, 58, and 59) that VLDPE is a copolymer of ethylene and butene or hexene or octene and that the EXACT resin is an ethylene/butene. The Office Action concludes that it would have been obvious to use the homogeneous linear single site catalyzed ethylene copolymers having hexene or octene comonomers in the films taught by RALPH since this is merely the substitution of one comonomer for another. As to Claims 15 and 62, the Office Action states that the second surface layer can be considered to be an inner layer, and that as to Claim 64, it would have been obvious to have increased or decreased the thickness of the film depending upon the impact strength desired.

In response, Applicants contend that for several reasons, Claims 1-5, 7-15, 36, 42, and 56-64, as amended above, are patentable over RALPH. First, Claims 1-5, 7-15, 36, 42, and 56-64 have been amended to recite a density of 0.902 g/cc, which does not overlap with the "about 0.900 g/cc" disclosed by RALPH, for the reasons advanced above. Applicants further point out that while the Office Action implies that Applicants' claims recite the density of the homogeneous copolymer

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<sup>1</sup> The phrase "about 0.900 g/cc, having three significant digits, spans the range of 0.8995 g/cc to 0.9005 g/cc. To a mathematical certainty, "about 0.900 g/cc" does not overlap "at least 0.901 g/cc". However, the above amendment

using the word “about”, this term was deleted in the amendment filed November 18, 1999. Moreover, the amendment of the claims clearly distinguishes the claimed density range from the density disclosed in RALPH, rendering moot reliance upon Titanium Metals Corporation vs. Banner, In re Malagari, and In re Wertheim.

Moreover, it would not have been obvious to make “minor variations to the density” by increasing the density of the EXACT 3010C 0.900 g/cc homogeneous copolymer disclosed in RALPH to result in a polymer having a density within the range of 0.902 g/cc, because to do so would go against the desired lowering of the seal initiation temperature disclosed in RALPH. See TABLE N of RALPH at Column 23, and particularly the discussion thereof at Column 23 lines 20-29, at which RALPH states that the seal initiation temperature may be substantially lowered by the addition of EXACT 3010C, with the net effect of desirably broadening the heat sealing range. Since melt point increases with increasing density, it would not have been obvious to increase the density of the EXACT homogeneous copolymer component, as this would go against the desired lowering of the seal initiation temperature and also go against the desired broadening of the heat sealing range. If anything, it would have been obvious to lower the density of the EXACT 3010C to a value below 0.900 g/cc, not to elevate the density to at least 0.902 g/cc, as now claimed.

The statement in the Office Action re Claim 8 reciting a homopolymer appears to be erroneous and is not understood. Claim 8 recites the homogeneous copolymer as being a copolymer of ethylene and an alpha-olefin having from 3 to 8 carbon atoms, and does not recite a homopolymer.

Likewise, the various statements pertaining to Claims 10, 11, 58, and 59, i.e., regarding VLDPE as a copolymer of ethylene and butene, hexene, or octene and then referring to the EXACT resin as an ethylene butene, are not understood. The EXACT 3010C copolymer disclosed in RALPH is not a VLDPE or a plastomer. Rather it is simply a “third component” which does not fall into the class of being a VLDPE or a plastomer. Note the Table in Column 5 of RALPH, which states that a VLDPE has a molecular weight distribution (Mw/Mn) of “above about 3”. Applicants note that homogeneous copolymers, such as EXACT 3010C, are well known to have a molecular weight distribution below 3. Thus, EXACT is not a VLDPE. Note also in this table in Column 5 of RALPH that “plastomers” are described as having a melting point below about 90°C, if they have any melting point at all. In stark contrast, Claim 27 of RALPH states that the ethylene butene copolymer having the Mw/Mn of about 2 has a melting point of 92°C. Thus, the EXACT 3010C resin is clearly not a plastomer. Rather, it is simply a “third component”, and it is listed as such in TABLE N at Column 23 of RALPH, in that it is listed separately from VLDPE, and separately from plastomer. The statements in the Office Action regarding Claims 10, 11, 58, and 59 assume that homogeneous copolymers are VLDPEs. As pointed out above, RALPH discloses homogeneous copolymers as being distinct from VLDPE.<sup>2</sup> Because RALPH discloses EXACT 3010C as being distinct from VLDPE, one of skill in the art would not apply statements regarding the use of various comonomers in VLDPEs to the third component which is EXACT 3010C. Thus, the rejections of

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<sup>2</sup> Applicants acknowledge that the Certificate of Correction states that Exact copolymer is a VLDPE. However, Applicants note that the Certificate of Correction is not prior art with respect to Applicants’ filing date. Thus, the only disclosure in RALPH which can be relied upon is the specification of RALPH as filed, which contains no teaching or suggestion that EXACT copolymer is a VLDPE.

Claims 10, 11, 58, and 59 should be withdrawn as there is no teaching or suggestion in RALPH to modify the comonomer of the EXACT 3010C.

As to the statement in the Office Action regarding Claims 15 and 62, i.e., that a second surface layer can be considered to be an inner layer, Applicants disagree. An inner layer is a core layer, not an outer film layer. As a core layer, the inner layer is not affected by the seal initiation temperature improvement in the outer layers of the film of RALPH. Table N in RALPH has the EXACT copolymer in a three-component blend in the outer layers of the film. In contrast, Claims 15 and 62 recite the homogeneous copolymer in an inner film layer. There is no teaching or suggestion in RALPH that the homogeneous copolymer can be in an inner film layer.

As to the statement in the Office Action regarding Claim 64, i.e., that it would have been obvious to increase the thickness of the film in order to increase the impact strength, Applicants note that RALPH is directed to a stretch shrink film. Those of skill in the art know that stretch shrink films have a thickness of no more than about 1 mil. See Table L at Column 22 of RALPH, which discloses the thickness of various stretch shrink films at 0.6 mil and 0.9 mil. Increasing the thickness of such as film will decrease the stretch shrink properties of the film. Moreover, Applicants have reproduced the film of RALPH, and have tested it for impact strength, and have determined that it has an impact strength of only 19 pounds. Moreover, note that the film of Applicants' Example 3 has a thickness of 1 mil but also has an impact strength of 65 pounds, which is more than three times the impact strength of the film of RALPH. See Applicants' specification at Page 17 lines 1-7 and Table 1 on Page 19 of Applicants' specification. Moreover, RALPH teaches that the addition of EXACT 3010C lowers the resulting tear strength of the film (see Column 23

lines 27-29 of RALPH) lower tear strength the he film. For all of these reasons, it would not have been obvious to thicken the film of RALPH in order to obtain a film with greater impact strength.

**IV. The Rejection of Claims 43-55 as Obvious over RALPH in view of Applicant's Admission at Page 10 Paragraph 3 of Applicants' Specification**

Paragraph 6 of the 17 January Office Action states that Claims 43-55 are rejected under 35 USC 103(a) as obvious over RALPH in view of admissions at Page 10 Paragraph 3 of Applicants' specification. The Office Action states that RALPH is relied upon as discussed in the rejections addressed above (under headings II and III), but that RALPH is silent as to processing conditions such as cascading water. The Office Action further states that Page 10 of Applicants' specification admits that well known orientation conditions can be used to orient Applicants' recited films, including cascading water. The Office Action concludes that it would have been obvious to have used conventional orientation techniques in order to produce heat-shrinkable films in accordance with RALPH. Regarding Claims 53 and 54, the Office Action states that the films can be irradiated before or after biaxial orientation. Regarding Claims 50-52, the Office Action states that optimizing the orientation temperature is within the level of ordinary skill in the art, that the films of RALPH shrink at 90°C and that therefore the orientation temperature would have taken place at 90°C.

In response, Applicants contend that Claims 43-55 are patentable over RALPH. Applicants note that orientation temperatures are not taught or suggested by RALPH. Moreover, Applicants contend that the temperature at which orientation is to occur requires undue experimentation because homogeneous ethylene/alpha-olefin copolymers have a different temperature profile from

heterogeneous resins of the prior art. When orienting films containing homogeneous copolymer, orientation conditions must be determined by trial and error in order to obtain the desired shrink and impact strength results.

The practice of establishing the orientation temperature for single site catalyzed, homogeneous resins was not obvious or known to those of ordinary skill at the time of the instant invention. The orientation temperature greatly affects the film properties and is established by trial and error. If the orientation temperature (e.g., hotbath temperature) is too low, stresses required to stretch the film by trapped bubble or tenter are too great and the film tears or the orientation bubble breaks. If, on the other hand, the temperature is too high, the material becomes too soft and tends to over-stretch in some areas resulting in uneven film thickness. The selection of the correct orientation temperature is especially difficult when dealing with homogeneous resins. This is because homogeneous resins have a single melting point, unlike heterogeneous resins, which have multiple melting points. Whereas heterogeneous resins may be oriented over a range of temperatures which are often about 20 degrees below the major melting point of the more crystalline portions, Applicants have discovered that homogeneous resins are very sensitive to orientation temperature and must be stretched at a temperature just slightly below the melting point. This sensitivity was not known to those of ordinary skill at the time of the invention. The orientation temperature had to be determined through experimentation. Evidence of property differences resulting from change in orientation temperature may be seen in Table III (Page 22) and Table IV (Page 23) of Applicants' specification. More particularly, compare Applicants' Example 11 with Example 13, and compare Example 12 with Example 14.



Raising the bath temperature from 195°F to 210°F reduced the shrink and impact value by a factor of about 2. This demonstrates the unpredictability, and the need for experimentation, in selecting the correct processing conditions of homogeneous resins. Based on the arguments set forth above, the rejection of Claims 43-55 should be withdrawn.

**V. The Various §103 Rejections Relying upon SCHUT  
and Van der SANDEN as Secondary References**

In Paragraphs 7, 8, 9, and 11 of the 17 January Office Action, various combinations of Claims 1-3 and 5-49, 53, and 56-64 are rejected 35 USC 103(a) as unpatentable over various primary references:

- (1) U.S. Patent No. 4,551,380, to Schoenberg ("SCHOENBERG")
- (2) U.S. Patent No. 5,055,328, to Evert et al ("EVERT et al")
- (3) U.S. Patent No. 4,457, 960, to Newsome et al ("NEWSOME et al"); and
- (4) U.S. Patent No. 4,532,189, to Mueller et al ("MUELLER et al")

each in view of the Schut "Enter a New Generation of Polyolefins" Nov. 1991 Plastics Technology ("SCHUT") and Van der Sanden et al. "EXACT Linear Polymers of Enhanced Sealing Performance" ANTEC 1992 ("VAN der SANDEN et al") as secondary reference documents. With respect to each of the primary references, the Office Action states that the primary reference discloses a multilayer heat shrinkable film comprising LLDPE in a blend with, for example, EVA, linear medium density polyethylene, polyvinylidene chloride, etc. The Office Action states that the primary references teach orientation using a double bubble method. While the Office Action admits that none of the primary references discloses a homogeneous copolymer (i.e., copolymer produced using single site catalyst), the Office Action states that SCHUT teaches a new type of LLDPE copolymers made using single site catalysts. The Office Action states that SCHUT

discloses single site catalyzed copolymers having a density of at least 0.90 g/cc, and further states that SCHUT teaches using these copolymers in multilayer films and blends exhibiting superior physical characteristics, such as lower seal initiation temperature, higher impact strength, and better clarity. The Office Action states that it would have been obvious to use the single site catalyzed copolymers in the heat shrinkable films of the primary references because SCHUT discloses the single site catalyzed copolymers as having far superior properties such as heat seal initiation temperature, higher dart impact strength, and better clarity. The Office Action refers to Van der SANDEN et al as teaching superior attributes of single site catalyzed copolymers and states that such copolymers are a choice material in the production of heat sealable films.

In response, Applicants contend that Claims 1-3, 5-49, 53, and 56-64 are patentable over each of the primary references (SCHOENBERG, EVERT et al, NEWSOME et al, or MUELLER et al) in view of SCHUT and Van der SANDEN. Applicants agree that each of the primary references teaches a multilayer heat-shrinkable film containing LLDPE, as well as blends of LLDPE and other polymers. However, the films disclosed by SCHUT and VAN der SANDEN et al are cast films or blown films, and as such are clearly not heat shrinkable-films; they are not films which inherently have the shrink properties present in films which have been extruded and cooled to their solid state by cascading water, and thereafter heated to the softening temperature of the polymer and then stretched in the machine and transverse directions followed by being quenched, so that the film will return to its unstretched dimensions when heated, i.e., so that the film is a heat-shrinkable film.

SCHUT teaches the use of the homogeneous copolymers for use in making coextruded cast films, wire and cable coatings, injection molded medical and automotive parts, and blown films.

The strength and clarity statements in SCHUT appear to relate to injection molded products and blown films, rather than to heat-shrinkable films. More particularly, the only films referred to in SCHUT are blown and cast films, neither of which is a downward cast water quenched film, and neither of which is a heat-shrinkable film. Although SCHUT states that it is likely that the new very narrow MWD resins will be used in layers and blends (i.e., in *cast* and *blown* films) because of their high price, SCHUT addresses non-economic concerns, i.e., technical concerns, in stating:

For now, the high shear and low melt strength of the new resins, caused by their very narrow MWD, means that optimized blow molding and monolayer blown film grades aren't yet possible, Exxon says. [SCHUT, at Page 17, Col 3]

Applicants have argued, in the Amendment filed 15 November 1999, the personal interview of 19 January 2000, and the personal interview of 10 October 2000, and the Amendment filed 23 October 2000, that the above-quoted statement in SCHUT is a teaching away from the use of the linear homogeneous resins for the making of a *heat-shrinkable* film. The above-quoted statement acknowledges the low melt strength of the "very narrow MWD" (i.e., homogeneous) resins from Exxon. Those of skill in the art recognized, at Applicants' 13 November 1992 filing date, that downward casting was (and for that matter, still is) the dominant commercial method for making heat-shrinkable films, and that downward casting requires significantly greater melt strength than is required for the manufacture of a blown film. As such, based on the above-quoted statement from SCHUT, one of skill in the art would have considered these Onarrow MWD resins to be unsuitable for the commercial manufacture of heat-shrinkable films. Applicants contend that this is a teaching away from the use of the narrow MWD resins in the making of a heat-shrinkable film using

cascading water cooling. Thus, there is no teaching or suggestion in SCHUT that would lead those of skill in the art to believe that the homogeneous Exxon copolymers disclosed therein are suitable for the making of a heat-shrinkable film. Rather, taking SCHUT as a whole, one of ordinary skill may not be motivated to combine and may well consider the polymer described in SCHUT not to be useful for making a heat-shrinkable film, due to the nature of the typical downward cast commercial production process for making heat-shrinkable films, which requires adequate melt strength for downward casting. Finally, the disclosure of improved impact strength in SCHUT is accompanied by a description including "coextruded cast films", "3-mil film", and "monolayer blown film grades." None of these films is a heat-shrinkable film. Applicants' discovery of increased impact strength in a *heat-shrinkable* film is clearly unexpected in view of SCHUT. The disclosure in SCHUT of a 107 in-lb impact strength obtained for EXXPOL EXACT-101 is for an injection molded product, *not a film*. One of skill in the art would not assume that the impact strength of an injection molded product would necessarily translate to film strength.

With respect to VAN der SANDEN et al, Applicants note that this document also fails to make any teaching regarding heat-shrinkable films. Rather, the films disclosed in VAN der SANDEN et al are 50 micron *blown* films disclosed in the paragraph spanning the bottom of the first column of Page 155 and the top of the second column of this same page. These films are disclosed as being *blown* monolayer films which were back taped with polyester tape.

There are significant technical distinctions between blown films and heat-shrinkable films. Applicants' claims are clearly directed to heat-shrinkable films. Applicants films have different characteristics from blown films because they are produced by a process which is fundamentally

different from the process used to make all blown films. That is, Applicants' claimed heat shrinkable films are produced by orientation while the polymer is in the solid state, i.e., at the softening temperature of the polymer. Moreover, each of the pending independent claims recites the extrudate as being cooled to its solid state *by cascading water*. This can only be accomplished using the downward casting process, which is the process used in the commercial manufacture of heat shrinkable films. Polymers having low melt strength tend to fall apart in the downward casting process if they are not adequately supported. Support is not required in an upward blown process, such as the process of Van der SANDEN.

In contrast to heat-shrinkable films, blown films are oriented while the polymer is molten. Thus, Applicants' claimed films are fundamentally different from the films described in both SCHUT and VAN der SANDEN et al. Those of skill in the art recognize this fundamental difference, and as a result would not be led to use the teachings of SCHUT or VAN der SANDEN in combination with SCHOENBERG or EVERT et al or NEWSOME et al or MUELLER et al. to produce Applicants' claimed films. SCHUT, in teaching the low melt strength of the homogeneous copolymers, is teaching away from using these polymers to make a heat-shrinkable film.

The properties of the films reported in SCHUT and VAN der SANDEN are of blown films. These properties do not necessarily or inherently translate to heat-shrinkable films. There is no guidance as to whether the properties of a blown film will necessarily or inherently translate to a heat-shrinkable film. They may, or they may not. However, no certainty or guidance has been shown in the prior art. While the properties may or may not turn out to be similar, there is no certainty or guidance from the content of SCHUT or VAN der SANDEN as to whether those

properties will turn out to be satisfactory or unsatisfactory. The homogeneous copolymers may or may not even be operable for the making of a heat-shrinkable film; performance is unknown and unpredictable.

For all of the above reasons, the various §103(a) rejections relying upon SCHUT and VAN der SANDEN should be withdrawn, as no prima facie case of obviousness has been established. In addition to the above arguments, Applicants note that they have obtained unexpected results *in heat-shrinkable films* using their recited homogeneous linear ethylene/alpha-olefin copolymer. More particularly, Applicants direct attention to Page 22 lines 19-27 of their specification, which is as follows:

The oriented multilayer films of Examples 11-22 were tested for free shrink and instrumented impact with the results given below in Table IV. It may be seen that when comparing the metallocene resin films of Examples 11 and 15 or 12 and 16 with the comparative example counterparts of 19 and 20, a substantial improvement in impact resistance is seen. Similarly, a comparison of Examples 13 and 17 or 14 and 18 with their respective comparative heterogeneous Examples 21 and 22 show an improved impact for the metallocene resins.

More particularly, the results in Table IV (Page 23, lines 1-16) show that the multilayer, *heat-shrinkable* films of Examples 11 and 15 have a peak impact strengths of 86.8 pounds and 77.4 pounds, respectively, while the *heat-shrinkable* films of corresponding comparative Examples 19 and 20 have peak impact strengths of only 54.2 pounds and 55.1 pounds. Comparing the average of the impact of Examples 11 and 15 (83.0 pounds) against the average of the impact strengths of comparative Examples 19 and 21 (54.65 pounds), one can see a 58% increase in impact strength. Similar results hold for a comparison of Examples 12 and 16 when compared against comparative

Examples 19 and 20 (44.6% increase). It should be noted that this is a comparison of multilayer films all of which were: (a) exposed to the same level of irradiation (2MR), (b) all of which were oriented by trapped bubble method out of hot water at 195°F, and (c) all of which were 5 layer films with 4 identical layers and a fifth layer which contained an ethylene/alpha-olefin having a density of 0.902 g/cc (Examples 11), 0.905 g/cc (Examples 15, 19, and 21). Thus, the only significant difference in the films was the type of polymer, i.e., homogeneous versus heterogeneous. The multilayer *heat-shrinkable* films containing the linear homogeneous copolymers exhibited an average impact strength more than 50% higher than the heat shrinkable films containing virtually identical heterogeneous copolymers. Applicants contend that this is evidence of unexpected result. Moreover, it was in their application as filed, and was not produced after the PTO rejected Applicants claims.

VAN der SANDEN et al makes no mention of heat-shrinkable films, not to mention impact-resistant heat-shrinkable films of Applicants' invention. VAN der SANDEN et al has no teaching or suggestion that the new Exxon polymers can provide heat-shrinkable films with impact strength more than 50 percent greater than was obtained using corresponding heterogeneous copolymers.

Applicants contend that until their invention, there was a substantial element of chemical unpredictability in whether a linear homogeneous ethylene/alpha-olefin copolymer could have been oriented in the typical downward casting (cascading water) commercial process used to make heat shrinkable films. Some polymers have enough wall strength for conversion to heat shrinkable films by a downward casting process, while others have not had the requisite wall strength. Applicants

have discovered that Exxon's metallocene catalyzed linear ethylene/alpha-olefin copolymers inherently lack adequate melt strength to undergo the downward casting process used in the commercial production of heat-shrinkable films. However, in order to obtain a heat-shrinkable film using the downward cast commercial process, the low melt strength of the linear homogeneous ethylene/alpha-olefin copolymer must be supplemented by other polymers in the film or made using a casting roll with orientation being carried out by tenter frame. Hence, some of Applicants claims are directed to multilayer films, and films in which the linear homogeneous polymer is blended with another polymer, so that the additional polymer can provide additional melt strength so that a downwardly cast tape can be extruded, cooled, reheated to its softening temperature, oriented, and quenched.

As pointed out in the 15 November 1999 Amendment, the only actual films disclosed in VAN der SANDEN et al are the 50 micron *blown* films disclosed in the paragraph spanning the bottom of the first column of Page 155 and the top of the second column of this same page. As discussed in the personal interview, blown films are not heat-shrinkable films; blown films are made from a process which is different from heat shrinkable films, and different technical challenges are involved in these different processes. VAN der SANDEN et al also states:

Each converting method (film, extrusion coating, lamination) has its own processing requirements (melt strength, thermal stability, rheology) which must be satisfied to yield the economical production of the packaging structure.

Applicants point out that this statement is in support of their position that different processing requirements apply to different film production methods. Applicants also contend that this



statement stands in support Applicants' position that melt strength is critical to the production of a heat-shrinkable film. That is, adequate melt strength must be satisfied in order to yield the economical production of the film. As Applicants have already argued, the melt strength requirements for making a heat-shrinkable film are different from the melt strength requirements to make a blown film.

In summary, Applicants have pointed out that the combinations of documents utilized in the various rejections do not establish a prima facie case of obviousness of the invention as claimed in the amended claims presented hereinabove. All of Applicants' claims recite the extrudate as being cooled by cascading water, which yields a film having different physical properties than those of the blown and cast films of SCHUT and Van der SANDEN. Moreover, SCHUT teaches low melt strength of EXACT® copolymers, which teaches away from using such polymers in a downward casting process. Teachings related to blown and cast films are not applicable to heat-shrinkable films made using a downward casting process. As a result, it is improper to combine SCHUT and Van der SANDEN with any of the primary references to render Applicants' claims obvious, in spite of the fact that SCHUT refers to multilayer cast or blown films and blends of homogeneous copolymers in cast or blown films. Even if a prima facie case of obviousness has been made out (which is not the case), Applicants have pointed out their discovery of unexpected results: heat-shrinkable films higher impact strength relative to heterogeneous copolymers. This stands as yet another reason Applicants' claimed heat-shrinkable films are patentable over any one of the primary references in view of SCHUT and Van der SANDEN.

**VI. The Rejection of Claims 1, 3, 4, 5, 6, 12, 14, 28, 35, 42 and 56  
as Obvious over WILHOIT**

In Paragraph 10 of the 17 January Office Action, Claims 1, 3, 4, 5, 6, 12, 14, 28, 35, 42, and 56 are rejected under 35 USC 103(a) as unpatentable over U.S. Patent No. 5,403,668, to Wilhoit (“WILHOIT”). The Office Action states that WILHOIT teaches blends of VLDPE, EVA, and a plastomer to produce heat-shrinkable single and multi-layer films oriented by double bubble biaxial orientation and irradiated, and that the homogeneous plastomer has a density of about 0.900 g/cc and a molecular weight distribution of less than 3, referring to the table on Column 5. The office action states that the plastomer resin would correspond with the linear homogeneous copolymer recited in the claims, and that the materials made by Mitsui using a single site vanadium catalyst have homogeneous properties. The office action goes on to state that VLDPE polymers are heterogeneous in nature, and that VLDPE has densities both less and greater than about 0.90 g/cc. Next, the office action states that the essential difference between the claims under examination and the teachings of WILHOIT is the specific use of homogeneous linear polymer (plastomer) having a density greater than about 0.901, and that the teachings of WILHOIT overlap with the claimed ranges because the term “about” gives the claim enough latitude to overlap the value of the densities of the homogeneous copolymers of WILHOIT.

In response, Applicants continue to maintain that Claims 1, 3, 4, 5, 6, 12, 14, 28, 35, 42, and 56 are patentable over WILHOIT. WILHOIT discloses various plastomers from Mitsui which are in fact linear homogeneous copolymers. However these plastomers have a density which is, at most, up to 0.885 g/cc. Applicants’ claims, as amended above, recite a density of at least 0.902 g/cc, which the Mitsui polymers do not teach or suggest.

WILHOIT describes the nature of VLDPE resins in a table in Column 5. These resins are heterogeneous because they have a molecular weight distribution “above about 3”, and they have “at least two crystalline phases with the dominant phase having a melting point of between about 100°C and about 125°C”, which also describes heterogeneous resins. Moreover, the various resins identified as VLDPE resins in Table A in Column 6 of WILHOIT are known to be heterogeneous resins, not homogeneous resins. As such, with one exception (EXACT 3010C discussed immediately below), no VLDPE resins in WILHOIT are homogeneous resins.

WILHOIT also discloses a comparative example using EXACT 3010C homogeneous copolymer, which is the same Exxon homogeneous copolymer disclosed by RALPH. See WILHOIT at Column 15 line 60 through Column 16 line 9. However, WILHOIT discloses the results of a plaque test using the comparative blend incorporating the EXACT 3010C: the shrink values for all four plaques containing the TAFMER resin were all “superior” to the comparative which contained the EXACT 3010C. Thus, it appears that WILHOIT is teaching that the EXACT 3010C, having a density of 0.900 g/cc, produces shrink results *inferior* to those produced using TAFMER resins from Mitsui.

In addition to WILHOIT’s teaching of the inferiority of EXACT 3010C for making a shrinkable plaque, Applicants again refer to the above amendment of each of their independent claims, to recite the homogeneous copolymer as having a density of “at least 0.902 g/cc”. As such, reference to the EXACT 3010C having a density of 0.900 g/cc in WILHOIT does not teach or suggest Applicants’ recited homogeneous polymer in a shrink film. Since WILHOIT teaches inferior shrink from the EXACT 3010C, one of skill in the art, in order to increase the shrink, may

think to lower the density to less than 0.900 g/cc, not to increase the density from 0.900 g/cc to at least 0.902 g/cc, the range recited in each of Applicants' independent claims, as amended hereinabove.

Moreover, Applicants point out that while the Office Action continues to refer to Applicants' claims as reciting "at least about" the recited density, such is not the case. The word "about" was deleted from each of the independent claims in the amendments filed November 1999 and October 2000. Thus, the disclosure of the EXACT 3010C resin at 0.900 g/cc does not overlap "at least 0.902 g/cc" as recited in each of Applicants' claims as currently pending. Moreover, there is no teaching, suggestion, or motivation to increase the density of the 0.900 g/cc EXACT 3010C of WILHOIT to a density of at least 0.902 g/cc. As such, no prima facie case of obviousness has been made out by the Office Action. Applicants also rely upon the various corresponding arguments set forth above in response to the rejections based on RALPH. Accordingly, based on all of the arguments set forth above, Applicants contend that the rejection of Claims 1, 3, 4, 5, 6, 12, 14, 28, 35, 42, and 56 as obvious over WILHOIT should be withdrawn.

#### **VII. Applicants' Reply to the "Response to Arguments" in Paragraph 12**

In Paragraph 12 of the 17 January Office Action, various remarks are set forth in response to Applicants' arguments filed 26 October 2000. Applicants address those remarks below.

The Office Action states that the arguments directed to the recitation that "the film is cooled by cascading water" does not set forth a patentable distinction because nothing in the record establishes any criticality to the method. In response, Applicants note that the record does in fact contain evidence of criticality of the cascading water process. SCHUT, in stating that the linear

homogeneous copolymers lack melt strength for the making of blown films, is teaching those of skill in the art that the linear homogeneous copolymers lack the melt strength for downward casting in which the film is cooled by cascading water. This is not mere attorney argument, as the very reference document being applied against the claims, i.e., SCHUT, makes this point.

There is also evidence that there is a criticality to the cascading water method and that it is used to produce a materially different product, i.e., a heat-shrinkable film. Such films are recognized by those of skill in the art as being different from blown films. Heat-shrinkable films exhibit substantial heat-shrink characteristics, in contrast to blown films.

As to the melt strength problem, Applicants direct attention to the fact that their specification discloses a solution to the low melt strength problem by disclosing multilayer films incorporating supplemental layers and/or blends of the linear homogeneous copolymer with one or more different polymers, including heterogeneous copolymers. The solution to the problem is provided even if the specification does not describe the problem in detail. It is the solution which is patentable, not the problem.

While the claims may not recite the downward casting method, they are effectively so limited because they recite cooling the film by cascading water. This can only be done if a downward extrusion is being carried out.

Contrary to the statements in the Office Action, the melt strength arguments do not contradict Page 10 of the specification. That is, while Applicants admit that the specification discloses orientation of films containing the linear homogeneous copolymer with “conventional orientation techniques”, it is clear that it is the orientation equipment and its general operation

which is conventional, not its use to orient a film containing the recited linear homogeneous copolymer. That is, the process of orienting a film containing linear homogeneous copolymer having a density of at least 0.902 g/cc is not a conventional process (rather, it is a novel process), even if the orientation equipment and its operation is otherwise as carried out generally described in the prior art. The process is not conventional because the film being oriented is not conventional. Indeed, whether such an unconventional film can be oriented via conventional processes is subject to speculation and unpredictability. The only way to know is to experiment. Operability of the process is not predictable, and hence not obvious.

As to RALPH's disclosure of a heat-shrinkable film containing EXACT linear homogeneous copolymer, Applicants again note that this copolymer has a density of 0.900 g/cc, whereas Applicants' claimed film contains a copolymer of higher density. Moreover, the 3010C linear copolymer disclosed in RALPH is disclosed as producing a film exhibiting lower tear strength. RALPH does not teach or suggest to one of skill in the art to use a linear homogeneous copolymer having a density of at least 0.902 g/cc. RALPH provides no motivation for elevating the density to at least 0.902 g/cc. In fact, RALPH only provides motivation for lowering the density below 0.900 g/cc in that RALPH teaches the use of the linear homogeneous copolymer to lower the seal initiation temperature.

While the Office Action suggests that Applicants consider submitting declarations showing evidence to support their position, Applicants contend that declarations are unnecessary because SCHUT, one of the very references being relied upon in various rejections of the claims, teaches that the linear homogeneous copolymer recited in Applicants' claims lack the melt strength

to make monolayer blown films. Applicants have disclosed and claimed heat-shrinkable films containing linear homogeneous copolymer using cascading water to cool the film, i.e., inherently a downward casting process, which SCHUT teaches away from in teaching melt strength too low for making monolayer blown films.

As to whether Applicants have established the criticality of 0.901 g/cc over 0.900 g/cc, Applicants contend that the burden is on the PTO to establish a prima facie case of obviousness that a density of 0.902 g/cc (as now recited) is taught or suggested by the prior art disclosing 0.900 g/cc. Clearly, this has not been done as RALPH does not teach or suggest raising the density, as to do so would operate against the desired lowering of the seal initiation temperature.

The Office Action points out that Applicants' claims are not limited to monolayer films consisting of homogeneous linear ethylene copolymer. In response, Applicants note that each of their independent claims have been amended to recite the presence of the homogeneous linear copolymer in an amount of from 15 to 100 percent, based on total film weight. Moreover, newly-presented claims 65-72 recite the linear homogeneous copolymer in an amount of from 51 to 100 percent, based on total film weight. Applicants contend that as such, the melt strength arguments apply to the amended claims and the newly-presented claims, as the linear homogeneous copolymer is recited as being present in a substantial amount, based on total film weight.

As to the combination of SCHOENBERG, EVERT et al, NEWSOME et al, and MUELLER et al in view of SCHUT and VAN der SANDEN, Applicants again point out that operability for cast and blown films does not predict operability in making a heat-shrinkable film. Rather, operability and results are unpredictable and speculative. Neither SCHUT nor VAN der

SANDEN offer any guidance as to whether the linear homogeneous copolymer will be operable or desirable in the making of a heat-shrinkable film.

As to the rebuttal of Applicants' increased shrink and increased impact arguments, i.e., the statements in the Office Action that because EXACT linear homogeneous copolymers having a lower melting point they will inherently provide a higher level of shrinkage because they can be oriented at a lower temperature, and the statement in the Office Action that SCHUT discloses improved impact strength, Applicants contend that this is an oversimplified view of their claimed invention. Shrink and impact properties in the resulting film depend upon the combination of polymers present, and the manner in which the film was made. Applicants have demonstrated that a simple change in orientation temperature can affect impact strength and shrink by a factor of two. One cannot predict, based on results with blown films containing linear homogeneous copolymer, the impact and strength results which will be obtained if the same polymer is used to make a heat-shrinkable film. The process and resulting product are different. Applicants have discovered that linear homogeneous copolymer having a density of at least 0.902 g/cc can be used to make a film having desirable shrink and impact properties. The combination of shrink and impact properties was not predictable from the disclosure of impact in SCHUT or the disclosure of shrink in RALPH.

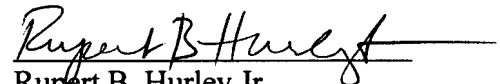
### **VIII. Conclusion**

In view of the above amendments and arguments, Applicants respectfully contend that the claims are in condition for allowance, and Applicants respectfully request reconsideration of the claims, with a view towards allowance.



Should there be any questions or otherwise needs to discuss any matters related to this application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully Submitted,

A handwritten signature in cursive script, reading "Rupert B. Hurley Jr.", followed by a horizontal line.

Rupert B. Hurley Jr.

Reg. No. 29,313

(864) 433-3247

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